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Kristine Koch
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue, Suite 900, M/S ECL-115
Seattle, Washington 98101-314

Re: Portland Harbor Feasibility Study
Draft Section 2, DEQ Review Comments

Dear Ms Koch:

The following are the Oregon Department of Environmental Quality review comments on the draft Section 2 of the revised Portland Harbor Feasibility Study. Review comments are provided as both general and specific comments as well as redline edits for your consideration.

General Comments

1. It appears that wildlife sediment PRGs were developed using a BSAF and the human health sediment PRGs for some chemicals were developed using the food web model. Wildlife and human health PRGs based on biota uptake from sediment should be based on the same methodology.

2. DEQ understands that EPA has to date not approved the food web model. Since the description of the food web model, Appendix B, was provided for review on August 18th, DEQ has not had a chance to complete our review and confirm that comments provided on the *Bioaccumulation Modeling Report, July 21, 2009* have been adequately addressed. Should EPA continue to utilize the food web model for PRG development, we would like to discuss how best to coordinate our review given limited resources.

3. Since many of the wildlife PRGs do not match either the 2009 PRG document or the LWG FS, references are needed before DEQ can complete our review of the methodology. For example, DEQ has had ongoing conversations with EPA on the avian methodology and understands the approach, however, the specific input parameters are needed (e.g. assumptions on organic carbon, lipid content used for the back calculation, and specifics on the acceptable tissue level derivation). DEQ requests that more detail on the wildlife PRG development be provided such as equations and tables that summarize the methodology and input parameters similar to the human health Appendix A1 so that we can complete our review.

4. The current EPA PRGs do not account for background. DEQ understands that EPA has decided to include background values in the revision to the PRG table. If organic carbon corrected values are to be used for background, DEQ requests the following text be included.

"On average, organic carbon content of sediment in the study area is about 50 percent higher than in upstream sediment used to develop background. As a simple means of incorporating organic carbon differences in the development of background concentrations, an organic carbon correction method was used, rather than using dry-weight sediment concentrations or organic-carbon normalized sediment concentrations. The correction approach is an approximation, and will best match results using organic-carbon normalization when there is not wide variation in both site sediment organic carbon content, and background sediment organic carbon content."

Specific Comments

Appendix A1 Human Health PRGs

Section 1.0 Introduction

The introduction states that the appendix addresses PRG development for sediment and biota. An explanation of the development of PRGs for surface water and groundwater is also needed.

Section 1.1.2 Risk-Based Tissue PRGs due to Infant Consumption of Breast Milk

1. In addition to steady-state conditions, the other difference from the risk assessment is an assumption of no chemical loss during lactation. Also, the risk assessment used a subchronic dioxin toxicity value (intermediate MRL from ATSDR) for infant exposure, while the PRG calculation approach for dioxins uses the same chronic toxicity values for both adults and infants.

Section 1.1.3 Incidental Ingestion of Sediment

1. In the first calculation, $Conc_{sed}$ should be labeled PRG_{sed}. It may be helpful to distinguish the PRG_{sed} values for noncancer and cancer effects.

2. It may be helpful to identify the potency adjustments by the term age-dependent adjustment factors (ADAFs).

Section 1.1.5 Calculation of Sediment Risk-Based PRGs for Fish/Shell Fish Consumption

cPAHs.

1. Developing an acceptable dry-weight cPAH concentration in sediment is a challenging task. The BSAR relationship relating benzo[a]pyrene concentration in tissue with sediment concentrations was established by the LWG using organic carbon normalized

data. In using the LWG's BSAR regression relationship to calculate a sediment dry-weight PRG for cPAHs, the mean clam tissue concentration, the mean clam lipid content, and the mean fraction of organic carbon in sediment are used. This indicates that the intended value for the sediment dry-weight concentration is a mean value. The approach presented in this section is an approximation because the mean of lipid-normalized tissue concentrations does not equal the mean of wet-weight tissue concentrations divided by the mean of fraction lipid in tissue. The lipid content of clams may be fairly consistent, so this could be an acceptable approximation. Similarly, the mean of oc-normalized sediment concentrations does not equal the mean of dry-weight sediment concentrations divided by the mean of fraction organic carbon in soil. Organic carbon content in sediment can vary considerably throughout the site. There may be more consistency in organic carbon content in areas where cPAHs are present. It may be more appropriate to use an organic carbon content consistent with these areas, rather than use a site-wide average value.

2. DEQ suggests that the uncertainty associated with developing a cPAH sediment PRG using the organic carbon normalized BSAR approach be acknowledged. The following is a suggested addition to the section.

"This approach attempts to derive a mean dry-weight sediment concentration based on a mean wet-weight clam tissue concentration, mean lipid content in clams, and mean fraction organic carbon in sediment. The approach is an approximation, and will best match results using organic-carbon normalization when there is not wide variation in both clam lipid content (a reasonable assumption), and site sediment organic carbon content (which is known to vary throughout the site)."

3. PRG_{sed} should be identified as being dry weight (ug/kg). f_{oc} is dry weight, and f_{lipid} is wet weight.

Hexachlorobenzene

Given that BSAF is usually defined using corrections for carbon content, it may be more helpful to present the definition of BSAF:

$BSAF = (C_{tissue} / f_{lipid}) / (C_{sed} / f_{oc})$

And then show the calculation for C_{sed}.

Appendix A2 Ecological PRGs

1. The document reads more like a summary of the BERA findings and general descriptions of derivation methods. Added calculation details on the PRGs, such as the equations and input values used to calculate tissue residue values protective of wildlife would improve the document clarity greatly.

2. Footnotes in the tables on the methods used would allow the reader to understand the PRG basis in the cases where the source is not in the header of the table (e.g "food web model", "BSAF")

3. The benthic approach is not clear.

    - RAO 5 Selected PRGs: How was the chemical list decided for protection of benthos? What was the hierarchy for selecting the source of benthic toxicity PRGs (LRM first, then PECs?)? It is noted that several of the EPA selected values, such as dieldrin, cadmium, and mercury are above those developed by the LWG in the FS from site specific models for the same chemical. Recommend using the LRM model in its entirety to predict areas of toxicity using all associated sediment criteria to make those predictions. Then use the results of the toxicity tests as the final criteria.

    - Toxicity Test Interpretation: Text in Section 2 describes that both survival and biomass must be considered a "hit" before it is considered exceeding a risk based PRG. It should be clarified how this is applied. If by species, what is the interpretation if only one of the endpoints exceed Level III thresholds? This is clearly a higher magnitude effect. Additionally, what if Level II survival is considered a hit but not biomass? DEQ understands there is concern taking action on Level II biomass hits, but Level II survival hits seem more of a concern.

    - Identification of Potentially Toxic Areas: What model / values will be used to identify or predict potential toxicity areas (haven't been tested yet) for evaluation in the FS? A comprehensive model (mean quotients, FPM, or LRM) is recommended. It would be best if this model matched the toxicity test interpretation (see above recommendation). For example, if the LRM was used, it would describe the probability that sediment would be toxic at a given threshold level. That threshold level would also be used to interpret the bioassay tests.

4. PRG Specific Comments / Questions:
    - Organic Carbon varied significantly in the Site. Therefore, DEQ recommends using the OC normalized PRG and the actual OC detected in each sample.

    - TBT: The worm PRG (tissue residue) was developed in units of mg/kg-OC (LWG Early PRGs 2009). However, the TBT PRG from the LRM for benthic toxicity was developed in dry weight. This should be flagged as it will be misinterpreted.

    - Where did the TPH sediment values come from? The table cites the LRM, but those numbers are OC-fines normalized.

FS Appendix B

In FS Appendix B, there appear to be inconsistencies in the deterministic values and the probabilistic range for the following:

Table B-4a

- Lipid content for phytoplankton, zooplankton, and crayfish.
- Fraction of porewater ventilated for amphipod (etc.)

Table B-4b

- Water content for sculpin
- Weight for smallmouth bass

Table 2.2-13 Summary of Portland Harbor PRGs by RAO and Media

RAO 2

1. Replace the column header Surface Water Target Level with Surface and Groundwater Bioaccumulation PRGs. The values listed here are AWQC ARARs and should not be considered "target levels". They are applicable to both transition zone groundwater (pore water) and surface water.

2. The values shown for sediment PRGs are now risk based, replacing background levels using in previous tables. Our understanding is that background levels will be used as PRGs for chemicals with risk-based values below background.

3. The surface water target level of 0.0018 ug/L is the organism only AWQC for individual cPAHs. AWQC are provided for individual cPAHs without converting to benzo[a]pyrene equivalents. The scientific basis for using BaP equivalents has been established for decades, although AWQC do not take this into account. AWQC are ARARs, so we may need to include them without modification.

4. According to FS Appendix A-1, Table 1, RAO 2 the target tissue level for arsenic should 0.00067 mg/kg, not 0.001 mg/kg.

5. The organism only AWQC for 1,2-diclorobenzene is 130 ug/L.

6. Appendix A-1 shows RAO 2 sediment PRG for hexachlorobenzene calculated from target tissue level of 0.6 ug/kg using BSAF. Our calculation using three species of fish gives a sediment PRG of about 0.08 ug/kg, not 0.04 ug/kg. Attempting to include smallmouth bass using an approximate BSAF value results in a PRG of about 0.03 or 0.04 ug/kg.

7. How was a RAO 2 sediment PRG of 130 for pentachlorophenol derived without a target tissue level?

8. Comparing with FS Appendix A-1, Table 1, RAO 2 the target tissue level for PBDE is 0.89 ug/kg based on infant exposure, not 26 ug/kg based on adult noncancer. An option for calculating sediment PRGs is to use the modeling for PCBs as a surrogate.

RAO 3

1. Surface water PRGs should be based on contaminants that exceed risk criteria as determined in the BHHRA and ARARs. Tap water PRGs are not ARARs.

2. Values for DDX, manganese and O-xylene should be dropped as they are based on tap water PRGs and were not identified in BHHRA as exceeding risk criteria for this drinking water pathway.

3. The value listed for perchlorate is based on a 2008 EPA interim drinking water health advisory and is not an MCL as noted in Table 2.2-14 and should be dropped from this PRG list as it also was not identified in the BHHRA for this pathway.

4. The MCL for 1,1-DCE is 7 ug/L, not 2.4.

RAO 4

1. Groundwater PRGs should be based on contaminants that exceed risk criteria as determined in the BHHRA and ARARs. Tap water PRGs are not ARARs.

2. Values for DDX, manganese and O-xylene should be dropped as they are based on tap water PRGs and were not identified in BHHRA as exceeding risk criteria for this pathway.

3. The value listed for perchlorate is based on a 2008 EPA interim drinking water health advisory and is not an MCL as noted in Table 2.2-14 and should be dropped from this PRG list as it also was not identified in the BHHRA for this pathway.

4. The MCL for 1,1-DCE is 7 ug/L, not 2.4.

5. Page 2-16 discussion of RAO 4 notes that this RAO also addresses indirect exposure to contaminated groundwater through fish and shellfish consumption. The numerical PRGs identified for this RAO do not address this exposure pathway. See comment on RAO 2.

RAO 6

1. Replace the column header Surface Water Target Level with Surface and Groundwater Bioaccumulation PRGs. The values listed here are AWQC ARARs and should not be considered "target levels". They are applicable to both transition zone groundwater (pore water) and surface water.

Table 2.2-14 Basis for Portland Harbor PRGs by RAO and Media

1. Change header under ROA 2 and RAO 6 to reflect RAO 2 comment 1 for Table 2.2-13.

2. Add reference for Dioxin/Furan under RAO 6 surface water.

3. Strike the RAO 2 reference for cyanide in water as no value is listed in Table 2.2-13.

4. The reference for cyanide for RAO 3 and RAO 4 should be the same.

5. The reference for perchlorate under RAO 3 and RAO 4 is not correct as there is no MCL for perchlorate.

Sincerely,

Matt McClincy
Project Manager
NW Region Cleanup Section

Cc Tom Gainer, NWR Cleanup

Attachements